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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/045,499	01/14/2002	Ramachandra Divakaruni	FIS-00-0023DIV	3282

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EXAMINER

TRINH, MICHAEL MANH

ART UNIT PAPER NUMBER

2822

DATE MAILED: 04/10/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/045,499	Applicant(s) DIVAKARUNI ET AL.	
	Examiner Michael Trinh	Art. Unit 2822	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 January 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 8-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 8-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>3</u> . | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

*** This office action is in response to Applicant's Pre-Amendment filed on January 14, 2002. Claims 1-7 were canceled. Claims 8-20 are currently pending.

** Specification page 9 is objected for misspelling at lines 4, 6, and 11 in which the term "shipped" should be --stripped--.

*** Applicant is advised that claim 12 and claim 19 are both dependent on the same base claim 11, and recite the same subject matter. Thus, Claim 19 is duplicated that of Claim 12. One of the claims should be amended or cancelled to avoid the duplication. Apparently claim 19 should depend on claim 15, instead of claim 11.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

2. Claims 8-11, 13-18, and 20 are rejected under 35 U.S.C. 102(e) as being anticipated by Bronner et al (6,063,657).

Bronner et al teaches a method for forming a dynamic random access memory structure comprising at least the steps of: forming a trench within a substrate; filling the trench with a trench conductor 205 (Figs 2A-2G; col 3, line 45 through col 5); forming a pad oxide layer 207 along a surface of the substrate adjacent the trench; forming a collar 204 along an upper portion of the trench such that the collar insulates the substrate from the trench conductor 205; forming an isolation region 220,261 adjacent the trench conductor; recessing the collar and the pad oxide

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(Fig 2E; col 4, lines 54-65); depositing a lip strap 250 comprising a conductor over the trench conductor 205 and in recesses produced by the recessing (Fig 2F; col 4, line 66 through col 5); and forming an isolation region 261,220 adjacent the lip strap and adjacent the trench conductor 205. Re claims 9 and 16, wherein a control device (not shown in Fig 2G, but shown in Fig 1F) is formed adjacent the trench, wherein the trench has a corner adjacent the control device, and the lip strap 250 (fig 2G) comprises a conductor surrounding the corner. Re claims 10 and 17, wherein a control device conductive region 134 (not shown in Fig 2G, but shown in Fig 1F) is formed adjacent the trench, and the lip strap 250 comprises a conductor formed along a side of the trench and thus along a portion of the conductive region 134 at the top corner of the trench. Re claims 11 and 18, wherein a collar insulator 204 is formed along a top portion of the trench (Figs 2C-2D), wherein the lip strap 250 comprises a conductor formed to extend from a top of the collar to top of the trench, the lip strap 250 further extending along a surface of the device adjacent the trench and perpendicular to the trench (Fig 2G). Re claims 13 and 20, wherein a trench top oxide 261 (Fig 2G) is formed such that the lip strap 250 extends into the trench top oxide and forms an inverted U-shaped structure. Re claim 14, wherein the lip strap 250 comprises a conductor formed along two perpendicular portions of a top corner of the trench (Fig 2G).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

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4. Claims 12 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bronner et al (6,063,657) taken with Kenney (5,710,080).

Bronner teaches a method for forming a dynamic random access memory structure as applied above to claims 8-11, 13-18, and 20.

Bronner lacks lining the trench with a node dielectric.

However, Kenney teaches forming in the trench a combination of silicon oxide and silicon nitride for the thin node dielectric layer 26 (col 4, lines 17-27), and then filling the trench with a trench conductor 28.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the method of Bronner by lining the trench with a thin node dielectric layer comprising a combination of silicon oxide and silicon nitride as taught by Kenney, because of the desirability to facilitate the storage of a charge in a trench capacitor structure.

5. Claim 15-18 and 20 are further rejected under 35 U.S.C. 103(a) as being unpatentable over Bronner et al (6,063,657) taken with Hsiao (6,291,286).

Bronner teaches a method for forming a dynamic random access memory structure as applied above to claims 8-11, 13-18, and 20.

Bronner teaches forming an isolation region adjacent the lip strap 250 (claim 8) and the trench conductor 250 (claim 15), but apparently lacks before forming the isolation STI region adjacent the trench conductor before forming the lip strap 250.

However, Hsiao teaches both alternative embodiments including a) either forming a lip strap 58 (Figure 3; cols 4-5) before forming an isolation STI region 60 adjacent the lip strap 58, or b) forming an isolation STI region 60 (Fig 5) adjacent the trench conductor 54 and then forming the lip strap 58 (Fig 6; col 5, line 15+).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the method of Bronner by forming the isolation STI region adjacent the trench conductor either before or after forming the lip strap as taught by Hsiao, because the order of these process steps are alternative and can be interchangeable in forming the isolation STI region for effectively isolating adjacent devices.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael M. Trinh whose telephone number is (703) 308-2554. The examiner can normally be reached on M-F from 8:30 Am to 4:30 Pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on (703) 308-4905. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.
Oacs



Michael Trinh
Primary Examiner